THURSDAY, AUGUST 22, 1889.

AFRICAN FARM PESTS.

Notes and Descriptions of a Few Injurious Farm and Fruit Insects of South Africa. Compiled by Eleanor A. Ormerod, F.R.Met.Soc., &c. (London: Simpkin, Marshall, and Co., 1889.)

MISS ORMEROD is indeed energetic. Not content with waging bitter war against the destructive pests of British crops, she extends her campaigns to far distant lands. Although applications of farmers for information as to the attacks of many injurious insects arrive incessantly from all parts of the United Kingdom, Miss Ormerod finds time to deal with the complaints of cultivators in all other parts of the world, and surveys insects from China to Peru. In 1887 an elaborate treatise upon a scale-insect (*Icerya purchasi*) which seriously injures vines, fig, orange, peach, and other trees and shrubs in Australia, was published by Miss Ormerod, giving full scientific details as to the life-history of this coccid, and as to methods of prevention and remedies likely to be beneficial. Just recently another work has appeared, entitled "Observations on some Injurious Insects of South Africa," written in Miss Ormerod's usual clear and interesting style, and admirably illustrated. From this we propose to take some extracts to show the cosmopolitan entomological knowledge of the authoress, as well as to give some idea of the enemies of cultivated plants in "Afric's golden sands."

The first reflection that arises from the perusal of this book, and of others descriptive of the usual plagues which follow in the wake of civilized cultivation, is that no clime nor culture under the sun is exempt from them. No sooner had orange groves been formed in the suitable lands of Florida than various scale-insects swarmed upon the trees. The purple scale, the white scale, the red scale, and the "chaff" scale, among others, threatened to ruin the crops and to kill the trees, until remedies were discovered by the skilful economic entomologists of the United States.

In the newly made tea plantations of Assam a red spider (*Tetranychus bioculatus*) has suddenly shown itself, and threatens serious mischief to the plants, unless some wash can be invented which will kill the spiders, and leave no taste in the tea-leaves.

So in Africa, scale-insects, especially the *Icerya purchasi*, have within the last few years, as shown by Miss Ormerod, extensively spread in Cape Colony, upon oranges, lemons, vines, and other kinds of fruit-trees. This scale-insect has also now become one of the most dangerous pests infesting fruit-trees in California. It is the opinion of Prof. Riley, the United States Entomologist, that the *Icerya purchasi* originated in Australia. There was some doubt at first as to this. It was thought that it came from Mauritius; but it was discovered that it was the species known as *Icerya sacchari* which was imported from thence upon sugar-canes to California.

Frequent and rapid communication between countries, and the general interchange of commodities of all kinds, have undoubtedly disseminated insects throughout the world. Thus the Hessian fly was brought from the United States with straw in packing-cases, and the flour moth (*Ephestia kuhniella*), has been recently imported into England from some European country, as the authorities conclude.

At the same time it is considered that the conditions of cultivation adopted in these days, being somewhat of a forcing and unnatural nature, favour the increase of insects, and, in a degree, predispose plants to their attacks, which become more varied and intensified year by year not only in this country but in all others. It is of the greatest importance, therefore, that cultivators should be advised by competent persons as to the life-histories of these crop destroyers, and as to measures to be taken to prevent their spread, and remedies to be used against them.

Miss Ormerod has arisen, a very *Dea ex machinâ*, and for several years has given timely instruction and advice to agriculturists of many nations, just as Professors Riley, Lintner, and Comstock have helped the tillers of land in the United States to detect and combat the onslaughts of many crop-destroyers. Prof. Lindeman is doing the same good work in Russia, Dr. de Man in the Netherlands, Dr. Taschenberg in Germany.

And in this her latest work, "Notes and Descriptions of Injurious Farm and Fruit Insects of South Africa," Miss Ormerod conveys much practical information which can be readily understood and easily utilized. At the same time it is scientific enough for entomologists, and interesting to those who are not cultivators or men of science.

Miss Ormerod explains her reasons as follows for publishing this account of African farm pests, though no explanation appears necessary for such a valuable service:—

> "About four years ago, Mr. J. D. Bristow, President of the East Province Natural History Society of Cape Colony, wrote to inquire whether, if I were furnished with notes regarding pests of the crops in East Province, Cape Colony, I would publish them. At that time there was not the opportunity which there now is of procuring sound and clear directions for treatment of insect as well as other attacks of crops and stock, by reference to the *Agricultural Journal*, published by the Department of Agriculture of Cape Colony, therefore I willingly agreed to do my best, in case trustworthy agricultural observations could be procured, and specimens of the insects referred to also sent for identification. Specimens of about fifty kinds of insects were sent over, of which a few proved to be of undescribed species; and I have given in the following pages, as far as I can, figures and observations of habits and means of prevention of some of the pests, and means by which they might be identified."

The first insect described is one of the well-known dangerous family *Melolonthidæ*, to which the familiar British cockchafer belongs. The scientific name is *Eriesthis stigmatica*, but it is commonly termed the "mealie," or maize, chafer, as it is the worst pest in the country for crops of maize, and destroys it from near Fort Beaufort right down to the Fish River mouth. This is very much smaller than the cockchafer, and smaller, too, than the rose chafer (*Cetonia aurata*), which is, however, of a different family.

Another chafer, *Hypopholis sommeri*, injures vines considerably, probably by devouring the leaves, in the perfect state, and feeding on the roots, in the larval state. It is much larger than the "mealie," of a red-brown colour, and, "judging from the number of specimens usually contained in collections received from South Africa, this would appear to be a very common species in that country."

It is desirable to destroy the insects belonging to this family both in their beetle and larval conditions. In the former case they may be shaken down from the trees and shrubs upon which they rest in a sluggish state during the day. The larvæ can be reduced in numbers by digging round the roots of the infested plants. "In Ceylon," Miss Ormerod remarks, "where the grubs of various kinds of chafers do much harm to coffee-plant roots, it is noted that on one estate a gang of coolies was employed to dig them out of the ground (for they are always near the surface at the end of the feeding rootlets), which they did at the rate of about a quarter of a bushel per man per day. Lime, salt, and carbolic acid were tried without effect, I believe."

Some species of Melolonthidæ, especially the common cockchafer (*Melolontha vulgaris*), are so destructive to trees, vines, and other plants in France, that the French Minister of Agriculture has recently issued orders to the various prefects to take steps to reduce their numbers.

A beetle of the family *Dynastidæ*, styled *Heteronychus arator*, and the "keever" by the farmers, is the most widespread and destructive of the African pests, according to a correspondent, being a subterraneous worker, attacking wheat by eating away the roots. In length of body it is from 12 to 15 millimetres, and resembles the British beetle *Aphodius fossor*, belonging, however, to a quite distinct family, of which no member occurs in Britain.

They are rarely seen above ground, biting off the wheat plants about an inch under ground. It will be plain to all practical persons that this insect must be a very difficult foe to deal with, as it comes out of the ground and flies about trees during the night, and retires to the wheat roots during the day. Miss Ormerod states that it is also found in St. Helena, and it is more particularly to be met with along the sides of roads near hay-fields and grass-lands, where it may often be seen dead in considerable numbers, "which points to this 'keever' beetle being a grass as well as a corn pest, and may give some clue as to where to look for their grubs, as in common course of things beetles die just after having laid their eggs." It is recommended to dress wheat plants thus attacked with paraffin and sand, or ashes, or dry earth, to prevent the attack of this beetle.

Two other beetles, the *Pentodon nireus* and *Pentodon contractus*, injure the wheat crops. They are larger than the *Heteronychus arator*, but are similar in their method of attack. Neither of these appears to have any common or local name.

Yet another beetle, belonging to the family of *Cetoniidæ*, in which the British rose chafer is grouped, and defined as *Rhabdotis semipunctata*, a pretty insect with a bright green upper surface marked with white lines and spots, causes much injury to the blossoms of apple and plum trees, and later on to ripening peaches and figs. In some parts it is so plentiful that the only peaches and figs saved were those tied up in muslin bags. Miss Ormerod suggests that the only measures against this insect are to catch the beetles in nets when flying in the sunshine, as is done in England, and destroying their grubs at the roots of trees and plants.

Among other Coleoptera figured are the *Mylabris oculata*, a large, handsome black beetle, with red or yellow bands, of the family *Cantharidæ*, possessing the same vesicating properties, and sadly troublesome to peas and beans and fruit blossoms. Also a *Bruchus*, an unknown species, but which Miss Ormerod conjectures may be *subarmatus*, Gyllenhal. "Of the British *Bruchi* this species is most nearly allied to *Bruchus loti*." From Miss Ormerod's careful account of its larva, it does not much differ from that of *Bruchus pisi*.

This species of *Bruchus* infests peas and beans just in the same manner as the British *Bruchus rufimanus*.

> "Its attack is seriously hurtful. In two of the beans figured above, I found four holes showing where the beetles had escaped; in another seven beetles had been present, and in another I found five beetles, or coloured chrysalids, still within. Mr. Bairstow reported that this pest when in larval condition reduces the interior of the seed to a fine powder, and passes into a pupa, sometimes in its powdery bed, which disappears almost immediately on the emergence of the perfect insect."

Miss Ormerod gives an elaborate account of the modes of attack of this *Bruchus*, which do not much differ from those of its British congener. Also, it is recommended that infested beans should be steeped in a solution of Calvert's carbolic acid, so diluted as not to damage the seed.

Among the destructive Lepidoptera, butterflies and moths, in South Africa, the large handsome *Papilio demoleus*, or orange butterfly, figures prominently. The larvæ of this insect eat the leaves of orange trees, appearing "generally at the end of November, or beginning of December, and in greater numbers on trees whose lower branches are allowed to trail on the ground. It is advisable to cut all branches one foot above the ground, to turn as often as possible the soil within a circle of one foot from the trunk, keeping it moist, and to watch for the grubs, which are large, and of a yellowish-green colour, during the summer season."

The caterpillars of a moth, *Trilocha ficicola*, belonging to the *Bombycidæ*, cause much damage to fig trees by eating their leaves and nascent buds. For this attack, hand-picking is advised, and turning over the soil beneath the trees where the cocoons may be.

The "diamond-back" moth (*Plutella cruciferarum*), so well known in Britain, is a source of much trouble to Cape cabbage-growers, for which Miss Ormerod prescribes nitrate of soda applications to push on the growth of the plants, and sweeping the infested plants with boughs fixed to a scuffler.

To fruit-growers, the orange fly "Trypeta" (*Ceratitis citriperda*) is a bitter enemy. "In some districts last year," Mr. Hellier writes, "Albany amongst the rest, four-fifths of our peaches, apricots, figs, and plums were uneatable." The fly deposits some half-a-dozen eggs in a fruit when it is getting ripe. From these maggots come, and soon render the fruit useless. Concerning its life-history, Miss Ormerod quotes Prof. Westwood's remarks, from which extracts will be received with much interest by all economic entomologists.

> "The perfect insect is one of the most beautiful of the order to which it belongs; the male is singularly distinguished by having two slender filaments arising between the eyes, knobbed at the tips, a peculiarity which we believe is possessed by no other dipterous insect, and which is wanting in the female. The larva is a white, fleshy grub destitute of legs, very similar to the celery fly, and like it possesses two small black hooks at the front of its body, which it alternately protrudes and retracts, thereby tearing the delicate membrane in which the drops of juice are contained. There are generally several of these larvæ in each orange, and when removed and placed upon a flat surface, they have the power of springing to a considerable distance, in the same manner as the well-known cheese-mite. When full-grown they eat their way out of the orange, and undergo the change to the pupa state on the outside."

Prof. Westwood adds that the presence of infestation might be inferred sometimes by a puncture not larger than that made by a pin, but generally surrounded with a withered and discoloured spot varying in size from sixpence to half-a-crown.

Miss Ormerod characteristically observes:—

> "One main point of information wanted to check attack is, Where does the maggot in natural circumstances undergo its changes to the chrysalis state? It might be found out very easily whether the maggots drop to the ground, by laying cloths smeared with any sticky material, which would prevent their straying away, beneath a few of the infested trees. Any fruit that is infested should not be allowed to remain on the ground to continue the attack, and if on investigation it should prove that the later maggots go into the chrysalis state in the ground, or even that a large proportion of them do so—or if it could be found where the flies generally hibernate—these points would help greatly in lessening attack."

Ostrich-farming, extensively adopted in South Africa, is much hindered by "a terrible pest," in the shape of the ostrich flies, of which sometimes there are "thousands on the ostriches, and that they irritated the birds so that half of their time was taken up in pecking at the flies, and that, judging from the increase in the last two years, if something was not done to destroy them, the feathers would not be worth sending to market, and the writer believed that in time they would destroy the birds."

The fly in question is akin to the "forest fly" (*Hippobosca equinæ*), which is found upon horses and ponies in the New Forest, in Hants. These get accustomed to the flies, and make no special demonstrations concerning them; but a horse which is strange to their attacks goes half mad when one of these insects gets upon it.

In the case of ostriches, Miss Ormerod considers tobacco decoctions, soapsuds, and other washes applied to the birds would be found to succeed. McDougall's dip has been used, and Miss Ormerod thinks that sulphur would be useful.

Cattle ticks (*Amblyomma hebræum*), of the family *Ixodidæ*, some of them three-quarters of an inch long by three-eighths wide, described as the "disastrous hide perforators of these regions," sadly vex the South African cattle, so that it would indeed be a boon to the country if any means could be discovered to destroy, or, what would be better, "prevent the presence of a little creature which moves a market downwards at a high percentage."

The most interesting part, perhaps, of this work is that which deals with some of the *Coccidæ*. First among these is the "Australian bug" (*Icerya purchasi*), which was noticed in the Botanic Garden at Cape Town in the latter half of 1873, and has now spread over 680 miles in the eastern provinces of Cape Colony. Where it came from, Miss Ormerod says, it does not appear, "but there is not room for doubt that the attack was set on foot by imported specimens, and that it rapidly became naturalized. It attacks" orange trees, vines, fig trees, deciduous fruit-trees, ornamental shrubs, and garden plants, even strawberry plants.

The life-history of this insect is remarkable. When the female, a salmon-coloured, tortoise-shaped insect, with six legs and long antennæ, is one-sixth of an inch long, it secretes snow-white cotton-like matter, which is formed under the mother for the covering and protection of its eggs. For some time the female moves about, but after a while all movement is arrested, and the insect seems glued to one spot. In time the eggs are hatched, and larvæ, as many as 200 often from one female, go forth to find congenial food upon the plant, and in turn lay eggs in the same manner. The eggs are not hatched at once, but the process continues for several weeks. In the meantime the mother shrivels up, and becomes a mere dead husk, covering the eggs and hatching young. The whole process extends over many weeks, and gives ample opportunity for immense damage to be caused.

The male is rarely seen. It has wings more than a fourth of an inch in expanse; its body is about the eighth of an inch long, orange-red in colour, with long ten-jointed antennæ. Prof. Riley gives the best account of the male insect, stating that it is "fond of shelter, and will get under any projecting piece of bark or under bandage placed round the tree, often creeping under clods of earth. It is rather sluggish during the day, remaining motionless in crevices of the bark or wedged in between females on the tree. There seems, in fact, a well-marked attempt at concealment. At the approach of night they dart rapidly about on the wing, swarming round infected trees."

Miss Ormerod prescribes various washes as remedies against this and other coccids, and gives a list of insect enemies, which are happily numerous and formidable. The larva of the "golden eye" (*Chrysopa perla*) is most useful, destroying the young "Australian bug" just at hatching-time within the sac of the female. The Chrysopa also devours quantities of Aphides which infest hop plants in England. Species of ladybirds (*Coccinellæ*) are by far the best friends to African cultivators. They are invaluable in destroying the perfected young in the nidus of the female "bug," just as they, both as larvæ (niggers) and perfect insects, eat myriads of hop Aphides in the English plantations.

There are other insects which do good service in keeping down this *Icerya*, described by Miss Ormerod, of which, however, there is not space to give any account. Other destructive and useful insects have not been alluded to for the same reason, but those who take an interest in economic entomology will do well to peruse this instructive little book, and extract for themselves its valuable contents.